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Behaviors and Attitudes towards Road Safety Measures among Adolescent and Young Adult Male Drivers

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Abstract: Background: Considering the high population density and the large number of vehicles per capita in Jazan region in the southwestern corner of Saudi Arabia. **Objective:** to assess the degree of awareness about road safety among male students at Jazan University. **Methods:** In this cross-sectional study, data were collected from a random sample of 1531 participants (response rate was 81.91%) using a semi-structured, interviewer-administered questionnaire. **Results:** The results revealed that the mean age of participants was 21 years, while the mean age of driving initiation was 14 years. Nearly half of the participants, 563 (47.4%), admitted using a mobile phone while driving, and more than a third of the participants, 420 (23.9%), admitted occasionally using a phone when driving. Furthermore, more than two-thirds of the participants, 869 (72.5%), made or received a call while driving. Regarding social media, more than a third of the participants, 447 (37.3%) admitted using WhatsApp while driving, whereas a quarter occasionally used WhatsApp. **Conclusion:** A remarkable majority of participants seemed to be aware of the road traffic accident (RTA) risk factors and road traffic injury (RTI) preventive measures in the questionnaire; however, they mostly chose not to follow these measures, thereby indicating an urgent need for specialized educational/behavioral interventions.
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Introduction

As road traffic accidents (RTAs) are mostly unplanned, a majority of them are avoidable. In 1956, a WHO Advisory Group defined an accident as an “unpremeditated event resulting in recognizable damage”. The magnitude of the RTA issue together with the real global desire to prevent road traffic injuries (RTIs) encouraged the World Health Assembly to adopt Resolution No. "WHA27.59" in 1974, which declared RTAs a major public health issue. These global efforts were later crowned by legalization of a special resolution (No 58/9) issued by the United Nations General Assembly and the World Health Organization to nominate 2004 as a year for road safety (Peden et al., 2004).

According to the statistics (Peden et al. 2004), a total of 1.2 million people worldwide lose their lives annually due to RTAs. In addition, some millions of other victims suffer from injuries, including serious permanent disabilities; therefore, no country has been untouched by this toll in lives and suffering, which affects mostly people in their young and productive ages. People younger than 25 years and children represent more than 30% of those who are injured or who lose their lives as a consequence of RTAs, most of whom are males (Park 2011; Crawford and McGrowder 2008; Peden et 2004). Given the high rate of fatalities and serious injuries caused by RTAs, a new research area called 'Accidentology' has been accredited. This research area is concerned with the following: 1) gathering accurate information regarding the level, category and other features of RTAs; 2) associating the incidence of accidents with personal behavior and the circumstances under which RTAs occur; 3) studying new and improved ways of changing attitudes; 4) searching for methods to make the environment less harmful; and 5) assessing more accurately the effectiveness of control measures (Park 2011).

By 2020, the total number of deaths and injuries due to RTAs is expected to increase remarkably, by approximately 65% worldwide; in low-income and middle-income countries, the rate of mortality is predicted to increase to 80% (Peden et al. 2004). In many countries including Saudi Arabia, RTAs are predominant among all fatal accidents. In the year 2008, injuries caused by RTAs were considered one of the top four major causes of deaths worldwide. Economically, for each case of mortality, there are

some 20 to 50 severe injuries requiring long-term intensive and expensive hospitalization. Scoring (25.7) immediately behind Libya (34.7) and the Sultanate of Oman (30.7), Saudi Arabia ranked third in terms of the fatality rate per 100,000 (Al-Maniri et al. 2013). This classification is in line with recent statistics (Wikipedia 2014.) that ranked Saudi Arabia #51 worldwide in terms of the number of motor vehicles per capita (i.e. i.e., 336 cars per 1000 persons). This situation has been worsening due to two risk factors including the absence of proper public transportation networks linking towns nationwide, e.g., in Jazan Area, and the prevalence of the tradition of illegal car races. These factors explain the most recent concerning statistics (Barrimah et al. 2012) that a total of 12 deaths a day in Saudi Arabia are attributed to RTAs.

RTAs, traffic legislation and awareness and implementation of road safety measures represent equal legs of a triangle in which every side and corner denotes high significance. RTIs are believed to be a major and growing contributor to the global burden in terms of critical issues related to public health (Onyema and Oladepo 2011; Chisholm and Naci 2008, Peden 2004) and highlight the lack of road safety awareness (Hussain et al. 2011). In theory, a valid driving license is used as a recognized means of proving proficiency for motor vehicle drivers worldwide (Okafo et al. 2013); however, in practice, this restriction alone may not guarantee the reduction or prevention of RTAs (Manigandan and Arunmozhi 2013; Barrimah et al. 2012; Hatamabadi et al. 2012; Mishra et al. 2010; Crawford and McGrowder 2008; Dixey 1999). Some researchers have attributed an incidence of approximately 30% of RTAs to drivers without valid licenses, poor road safety awareness, and insufficient enforcement of restricted laws (Patil et al. 2008; Chaudhary et al. 2005).

A fairly large body of literature has been devoted to the issue of RTAs and associated RTIs worldwide. Hussian et al. (2011) indicated that the key factors associated with a frequent incidence of RTAs in Pakistan and South East Asian countries were deficiency in road safety awareness, especially regarding seatbelt use, use of helmets and legislative matters, mainly under-age driving and vehicle unfitness. Jha et al. (2004) revealed that many RTAs occurred more often on the second day of the weekend and the first business day of the week and mostly between 6:00 and 7:00 PM. In addition, fatalities were observed mainly among less-educated male workers. Conversely, Al-Khateeb (2010) reported that over 75% of RTAs occurred in daylight, although he observed a noticeably high rate of RTA incidence on the first business day of the week (Saturdays) and during the summertime i.e., holidays. This correlation may highlight some kind of association between RTAs and the behavioral attitudes and lifestyle of each community. On the other hand, Milo et al. (2008) identified an association between the incidence of psychostimulant substance use and fatal RTAs, in which over 60% of victims were in their productive age, i.e., 20-40 years; this finding in turn indicated, in a way, a deficiency in restricted law enforcement and an obvious non-commitment to road safety awareness. Deficiency in knowledge concerning road safety measures clearly has adverse consequences for good traffic safety practices, thereby perpetuating RTIs as a severe public health issue (Singh et al. 2014; Ifeoma et al. 2013).

Among the many traffic safety measures, the mandatory use of a seatbelt was designed to decrease fatal and severe RTAs; however, despite the demonstrated efficiency of this intervention, its use is significantly low in many countries (Onyema and Oladepo 2011; Oluyemi, 2007). Other traffic safety obligations include road signs, which are categorized as regulatory, informative and warning, and the establishment of permitted speed limits based on vehicle category and road usage, i.e., roads in built-up areas, highways and expressways (Ifeoma et al. 2013). Ansari et al. (2000) revealed that private motor vehicles are the main means of transportation in Saudi Arabia, where a total of 564,762 people died or were injured in RTAs between 1971 and 1997. This figure represented 3.5% of the total Saudi population at the time of that study. Another study by Barrimah et al. (2012) attributed the accelerating rate of RTAs across Saudi Arabia to the rapid expansion of road development, which was accompanied by a remarkable increase in the number of registered motor vehicles. RTIs are accountable for a considerable loss of lives, disability and injury among the population in the Al-Qassim area, in central Saudi Arabia. One of the hypotheses is that the collective societal behavioral attitudes of local communities somehow do not form a protective pattern. This misbehavior thus requires the urgent implementation of awareness interventions to promote a culture of road safety among all road users with a strong emphasis on young male drivers. This target population was selected based on two considerations: 1) the restriction of motor vehicle driving in Saudi Arabia to males only and 2) the frequent involvement of young drivers in RTAs. Fortunately, thorough experience driving vehicles has a remarkable influence on the knowledge of posted signs in the Middle-East (Al-Madani 2000). Strictly speaking, adequate awareness of road safety measures by various road users, especially young drivers, is essential for preventing RTAs and subsequent potential RTIs. Surprisingly, despite the high population density in Jazan region compared to its total area, no studies have been performed on road safety awareness in this

area. Therefore, given this background, the first research study of its kind in Jazan was conducted to assess road safety measures and determine the risk factors of RTAs. Specifically, this study addressed the issue of road safety awareness among the young male population in Jazan University while considering various factors, including socio-demographic traits and driving experience, and their potential impact on knowledge of safety measures.

Material and Methods

Study site and population

This study was conducted in four campuses (Medical, Science, Administration and Abu Arish) of Jazan University within Jazan city, which is located in the southwestern corner of the Kingdom of Saudi Arabia. According to the 2010 census, the Jazan region has a population of 1.3 million. The study site was selected based on random sampling.

Study design and sampling plan

This study was designed to assess the level of traffic safety awareness among younger drivers in Jazan area. This design was selected because, for one, the population of Jazan University represents the most educated elite group in the area. Furthermore, the study assessed adolescents and young adults because they represented the age group involved most frequently in road traffic accidents, as previously mentioned.

Sampling plan

The sampling design included three-stage cluster random sampling; each campus was considered an independent cluster. Stage one involved a random selection of four campuses (clusters). The second stage was the selection of colleges; for the purposes of this study, at least one college was selected in each cluster. The final step was the selection of study subjects out of the total population of fulltime registered students; sample selection was conducted using systematic random sampling. To implement the sampling plan, the sampling frame and the total number of University students were prepared in collaboration with the Deanship of Admission and Registration at Jazan University. Probability proportional to size sampling (PPS) was used to determine the number of participants in the different selected campuses and colleges. The sample size was confined to fulltime-male students given the dominant social custom in Saudi Arabia in which motor vehicle driving is restricted to males only. Data were collected from five randomly selected Faculties of Jazan University. These included the Faculties of Medicine, Applied Medical Sciences, Science, Business Administration and Education. Due to difficulties in sample collection, the Faculty of Engineering was excluded. Thus, the total sample size was 1531, which became 1254 after the data were cleaned, for a response rate of 81.91%.

Study variables

- **Dependent variable**

The dependent variable included road safety measures, mainly driving capability and driving behaviors.

- **Independent variables**

The independent variables included the following: age, province, town/village, campus, college, year in school, lifestyle, and marital status.

Data collection plan

- **Study instrument**

A pre-tested semi-structured questionnaire was used as the data collection tool and was culturally adapted to the conservative societal customs of the Saudi community. The questionnaire was administered to eligible participants by trained data collectors.

Data analysis and interpretation plan

- **Data entry**

Double data entry was performed using Statistical Package for the Social Sciences (SPSS) developed by IBM, New York. Each variable in the questionnaire received a label that identified its place in the dataset, and for each variable, every possible value was coded by a digit. Incomplete data were discarded from the dataset to create the final complete dataset used for the analysis.

- **Data analysis plan**

The cleaned data were analyzed using SPSS version 20.1. The analysis involved descriptive statistics as well as inferential statistics. Descriptive statistics included simple tabulation, frequencies and percentages, which were used to analyze the socio-demographic characteristics and percentages of the independent variables. Descriptive statistics were used to provide a snapshot of the study population's characteristics by categorizing their sociodemographic variables and allow for the observation of all the variables being analyzed. Questions regarding behavior and capability were scored and pooled to generate the dependent variable (DV). DV was scored as 1 or 2, with 1 representing a disciplined driver and 2 an undisciplined driver.

Ethical considerations

Informed consent in the Arabic language was obtained from each participant before the questionnaire was administered and clearly indicated the voluntary nature of participation. It was mandatory for the investigators to prepare forms that were signed only after the purpose and benefits of the study had been clearly explained to the participants. A brief note relaying this information was also clearly stated on the top of the first page of each sheet in the questionnaire as a basic introduction to the study. Privacy and confidentiality were maintained throughout the study

period. This study obtained the approval of the Standing Committee for Biomedical Research Ethics of University of Jazan (No. SCBRE-1436-02).

Results and Discussion

The data obtained are presented as cases by category of assessment of road safety measures among male students at Jazan University in Jizan city. The variables included residency, faculty, semester, marital status, working status, mode of living, age, monthly income, and age of driving initiation. The results are presented in Tables 1 (a & b) to 6.

Considering the normal skipping of some questions by the participants, the results in Table 1 show that most of the respondents were residents of Jizan city and studied in the faculties of Science 349 (28.2%) followed by Business Administration 309 (25%), Education 278 (22.5%), Applied Medical Science 235 (19%) and Medicine 63 (5.1%); additionally, most were in their early to middle years of study, single 1142 (93.5%), not working 1114 (92.1%) and living in urban areas 684 (56.1%).

The results show that the mean age of participants was 21 years, while the mean age of driving initiation was 14 years, with a small margin of deviation of 3.38 (Table 1b). Almost all participants had experience driving a vehicle 1173 (96.5%), and they mostly rated themselves as excellent drivers 856 (70.7%). However, only 878 (72.3%) had a valid (91.7%) driving license (Table 2).

A considerable number of participants, 460 (38%), seemed to have some tendency toward high speed driving, although most of them, 877 (72.3%), described themselves as committed to following traffic light restrictions. However, regarding traffic signals, the commitment to restrictions was not as high as the commitment to traffic light restrictions, at only 678 (56.2%).

Table 1a: General Information

Category	Sub-category	Frequency	Percentage
Residency	Jizan	287	26.5
	Abu Arish	154	14.2
	Sabya	124	11.4
	Al-Darb	29	2.7
	Al-Aridhah	59	5.4
	Samtah	164	15.1
	Fifa	22	2.0
	Damad	48	4.4
	Al-Ahad	53	4.9
	Al-Dayir	37	3.4
	Al-Aydabi	19	1.8
	Frasan	10	.9
	Beesh	67	6.2
	Al-Harth	9	.8
	Al-rath	3	.3
Faculty	Business Administration	309	25.0
	Education	278	22.5
	Science	349	28.2
	Medicine	63	5.1
	Applied Med. Sci	235	19.0
Semester	1st	5	.4
	2nd	98	8.0
	3rd	130	10.6
	4th	252	20.5
	5th	189	15.4
	6th	184	15.0
	7th	153	12.5
	8th	199	16.2
	9th	7	.6
	10th	7	.6
	11th	2	.2
	12th	2	.2

Marital Status	Single	1142	93.5
	Married	75	6.1
	Divorced	2	.2
	Widow	2	.2
Working Status	Yes	95	7.9
	No	1114	92.1
Living Area	Rural	535	43.9
	Urban	684	56.1
Total	**1254**		

Table 1b: Average of Factors Associated with RTA

Category	Mean	Std. Deviation
3- Age	21	1.454
6- Monthly Income	1426	1465.538
9- How old are you when you drove a car for the first time?	14	3.380
Number of Accidents:31- If the answer is "YES", how many times?	2.05	1.561

When participants were questioned about their commitment to legal parking spaces, the majority, 467 (39.7%), said that they were not committed, followed by a sub-majority of 425 (36-1%) who were only occasionally committed; this finding may predict some violations of this measure depending on the availability of a parking space, the presence of a traffic policeman and/or the state of the driver.

The same findings applied to restrictions regarding seatbelt use, with the majority 582 (48.1%), committed only in the presence of a policeman. Nevertheless, the majority, 499 (41.1%), claimed that they encouraged their passengers to fasten their seatbelt, contradicting the fact that they (participants) paradoxically did not fasten their seatbelts themselves in the absence of a policeman (Table 2). Fortunately, the majority, 862 (71.7%), of participants agreed that they used a child-safety lock whenever there was a child in the vehicle. However, an unfortunate and riskier finding was that a substantial proportion of the participants, 508 (42.3%), reported easily becoming nervous during traffic congestion {*in addition, 369 (30.7%) (Participants admitted sometimes having this nervous behavior*).

Table 2: Knowledge and Attitude of Driving

Question	Answer	Frequency	Percentage
8- Have you ever driven a car in your entire life?	Yes	1173	96.5
	No	43	3.5
10- How do you rate your driving skills?	Excellent	856	70.7
	Good	264	21.8
	Moderate	65	5.4
	Bad	26	2.1
11- Do you have Driving License?	Yes	878	72.3
	No	337	27.7
12- What class your driving license is?	General	309	33.8
	Private	606	66.2
13- What is the status of your driving license?	Valid	837	91.7
	Expired	76	8.3
14- What is the fastest speed you can drive?	(0-25 km/h)	118	9.7
	(26-50 km/h)	249	20.6
	(51-100 km/h)	226	18.7
	(101-150 km/h)	460	38.0
	> 150 km/h	158	13.0
15- How do you rate your restriction with traffic light?	Committed	877	72.3
	Committed when I see Traffic Policeman	189	15.6
	Sometimes Committed	136	11.2

	Totally not committed	11	.9
16- Do you park your vehicle at legal parking space?	Yes	284	24.1
	No	467	39.7
	Sometimes	425	36.1
17- How do you rate your restriction with traffic signals	Committed	678	56.2
	Committed when I see Traffic Policeman	251	20.8
	Sometimes not committed	240	19.9
	Totally not committed	37	3.1

Table 2 (cont'd)

Question	Answer	Frequency	Percentage
18- How do you rate your restriction with fixing seat belt?	Committed	266	22.0
	Committed when I see Traffic Policeman	582	48.1
	Sometimes not committed	218	18.0
	Totally not committed	145	12.0
19- Do you encourage passengers to fix the seat belt?	Always	499	41.1
	Sometimes	394	32.5
	Yes, when I see traffic policeman	67	5.5
	Rarely	146	12.0
	Totally not	108	41.1
20- Do you use child safety lock when there is a child passenger in your vehicle?	Yes	862	71.7
	No	341	28.3
21- Do you feel nervous during traffic congestion?	Yes	508	42.3
	No	325	27.0
	Sometimes	369	30.7
22- Do you hesitate in taking decision during traffic?	Yes	320	27.6
	No	563	48.5
	Sometimes	277	23.9
23- Do you use your mobile phone while you are driving?	Yes	567	47.4
	No	210	17.5
	Sometimes	420	35.1
24- Do you dial or receive calls while you are driving?	Yes	869	72.5
	No	91	7.6
	Sometimes	238	19.9
25- Do you use WhatsApp while you are driving?	Yes	447	37.3
	No	445	37.1
	Sometimes	308	25.7
26- Do you use car stereo during driving?	Yes	858	72.6
	No	115	9.7
	Sometimes	209	17.7
27- Do you drive under influence of any illicit substance?	Yes	139	11.7
	No	980	82.1
	Sometimes	74	6.2
28- If the answer is "YES", what kind of substances do you use?	Khat	167	57.0
	Captagon	22	7.5
	Other	104	35.5
29- How many hours per day do you use your mobile phone?	(0-2 Hours)	240	20.0
	(3-5 Hours)	460	38.4
	(5-10 Hours)	287	24.0
	>10 Hours	211	17.6
Total	**1254**		

The environment might have a passive effect on participants' focus during driving, especially when there is a noisy atmosphere inside the vehicle, as observed in question #26, in which over two-thirds of participants, 858 (72.06%), reported using the car stereo loudly (Table 2).

This situation can be considered together with the answers to question #51 in Table 4 (*How was the traffic congestion at the time of accident?*), in which most of the participants described the traffic as congested 222 (31.5%), very congested 177 (25.1%) or moderately congested 167 (23.7). This situation was worsened by the fact that nearly half of the participants, 563 (47.4%), admitted using their mobile phone when driving, while more than a third of the participants, 420 (23.9%), admitted occasionally using their phone when driving as well (Table 2). Furthermore, more than two-thirds of the participants, 869 (72.5%), dialed or had received a call while driving. In terms of social media, more than a third of the participants, 447 (37.3%), admitted using WhatsApp while driving, whereas a quarter of the participants occasionally used WhatsApp (Table 2). This result is consistent with the responses to question #29, which asked about the number of hours a day that the participants usually spent using their mobile phone; the answer showed that over 40% of the participants usually spent from 5 to >10 hours a day using their mobile phone (Table 2). Therefore, using a phone and WhatsApp in particular can be considered a predictive factor of the occurrence of RTAs, considering that a remarkable number of participants, 980 (82.1%), did not drive under the influence of any type of illicit substance.

In the last five years, more than half of the participants, 688 (57.8%), had experienced an RTA (Table 3). The average occurrence of RTAs during those five years was 2.05 (Table 1b). Nearly half of the participants, 325 (48.4%), stated that the cause of the RTA(s) was the other driver, while a quarter of the participants, 165 (24.6%), said that they had caused the RTA. Road conditions were the third major cause of the RTAs experienced by the participants in the last 5 years (Table 3).

Table 3: Accident Experience

Question	Answer	Frequency	Percentage
30- Have you ever had an accident in the last 5 years?	Yes	688	57.8
	No	502	42.2
32- If the answer is "YES", was it avoidable?	Yes	251	42.5
	No	339	57.5
33- If the answer is "YES", who was the responsible?	Me as a driver	165	24.6
	The other driver	325	48.4
	Road condition	110	16.4
	Weather (Dusty Storm, Rain, Fog)	23	3.4
	Traffic	27	4.0
	Condition of my vehicle	11	1.6
	Traffic laws	10	1.5
34- If the answer is "YES", did you or other driver try to overtake at the time of accident??	Yes	243	35.6
	No	439	64.4
35- If the answer is "YES", did you follow overtaking rules?	Yes	289	60.0
	No	193	40.0
36- If the answer is "YES", how do you classify yourself?	Victim	398	70.6
	Guilty	166	29.4
37- Do you suffer any physical injuries?	Yes	157	20.6
	No	604	79.4
38- If the answer is "YES", what kind of injuries?	Superficial	186	59.8
	Open wound	52	16.7
	Dislocation, sprain and strain of joints and ligaments	49	15.8
	Nerve injury	12	3.9
	Eye and orbit/blood vessel	12	3.9
Total	**1254**		

Nearly two-thirds of the participants, 439 (64.4%), did not overtake the other vehicle during the accident, compared to the remaining third of participants 243 (35.6%) who did so but in a safe way in accordance with the rules for overtaking 289 (60%). Consequently, the majority of the participants, 289 (70.6%), who experienced an RTA in the last 5 years considered themselves the victim, while 166 (29.4%) considered themselves to be guilty. However, one positive finding was that there were no physical injuries among 604 (79.4%) of the participants who had experienced an RTA, and even those with minor casualties, 157 (20.6%), suffered only superficial injuries, 186 (59.8%), as shown in Table 3.

More than a third of the RTAs experienced by the participants occurred on a national highway, 250 (34.7%), followed equally by a provincial highway 195 (27.1%) and a town road 195 (27.1%), as presented in Table 4. Almost all of these roads, 635 (88.6%), were constructed with tar material. Furthermore, nearly half of the RTAs, 318 (47.6%), occurred at a junction of 2 or more roads where there were no speed breaker signs 444 (67.3%) nor road dividers 341 (51.7%), and the others occurred at a turning of the road 346 (52.8%). Additionally, most of these roads had no lamps or light poles 339 (52.8%); however, this issue had no substantial impact on the occurrence of the RTAs experienced by the participants, considering that most of the participants, 535 (76.5%), were familiar with the road where the RTA(s) occurred. In addition, there was enough and adequate light at the scene of the RTA for 400 (59.6%) participants, and more than half of the participants, 253 (53.8%), were able to see the approaching vehicle (Table 4). The condition of participants' vehicles was excellent 367 (53.6%), good 139 (20.3%) or moderate 93 (13.6%). In addition, more than half of the participants, 355 (49.6%), mentioned that car servicing was available or sometimes available 225 (31.4%), and the availability of car servicing was rare for 67 (9.4%).

Table 4: Environmental Factors

Question	Answer	Frequency	Percentage
39- If the answer is "YES", What was the class of road?	National Highway	250	34.7
	Provincial Highway	195	27.1
	Town Road	195	27.1
	Village Road	80	11.1
40- If the answer is "YES", What was the material of the road?	Tar	635	88.6
	Concrete	47	6.6
	Gravel	16	2.2
	Soil	19	2.6
41- If the answer is "YES", was there any junction of 2 or more roads?	Yes	318	47.6
	No	272	40.7
	I don't know	78	11.7
42- If the answer is "YES", were there any speed breaker signals?	Yes	128	19.4
	No	444	67.3
	I don't know	88	13.3
43- If the answer is "YES", was there any road divider?	Yes	238	36.1
	No	341	51.7
	I don't know	81	12.3
44- If the answer is "YES", was there any turning of road?	Yes	206	31.5
	No	346	52.8
	I don't know	103	15.7
45- If the answer is "YES", was there any street lamp or light pole?	Yes	206	32.1
	No	339	52.8
	I don't know	97	15.1
46- If the answer is "YES", were you familiar with the road?	Yes	535	76.5
	No	164	23.5
47- If the answer is "YES", was an adequate lighting available at the time of accident?	Yes	400	57.9
	No	202	29.2
	No applicable	89	12.9
48- If the answer for Q47 is "NO", were	Yes	253	53.8

you able to see the approaching vehicle?	No	140	29.8
	No applicable	77	16.4
49- If the answer is "YES", how was the overall condition of your vehicle?	Excellent	367	53.6
	Good	139	20.3
	Moderate	93	13.6
	Bad	86	12.6

Table 4 (cont'd)

50- If the answer is "YES", was car servicing available?	Available	355	49.6
	Sometimes available	225	31.4
	Rare	67	9.4
	Not available	69	9.6
51- If the answer is "YES", how was the traffic congestion at the time of accident?	Very congested	177	25.1
	Congested	222	31.5
	Moderately congested	167	23.7
	Less congested	138	19.6
52- If the answer is "YES", how was the weather at the time of accident?	Hot and dry	459	65.9
	Drizzling	56	8.0
	Heavy rain	24	3.4
	Humid	105	15.1
	Dusty	35	5.0
	Sandy Storm	17	2.4
Total	**1254**		

It was evident that the weather had no particular influence on the RTAs experienced by the participants, as most of them described the weather during the RTA as hot and dry 459 (65.9%) and somewhat humid 105 (15.1%), as shown in Table 4.

The results presented in Table 5 also reveal that the majority of the participants who experienced RTAs did not suffer from fatigue 487 (67.3%) at the time of the RTA, were not under any emotional stress 455 (63.3%), did not have overcrowded vehicles 555 (79.7%) and were not carrying younger adults 471 (66.2%). In contrast, most of the minority who experienced some sort of emotional stress, 264 (36.7%), mentioned academics 160 (49.2%) and family 107 (32.9%) as the main causes of their stress (Table 5).

Table 5: Occurrence of Unexpected Factors during the RTAs Experienced by the Participants

Question	Answer	Frequency	Percentage
53- If the answer is "YES", were you suffering from fatigue at the time of accident?	Yes	237	32.7
	No	487	67.3
54- If the answer is "YES", were you under any emotional stress at the time of accident?	Yes	264	36.7
	No	455	63.3
55- If the answer for Q54 is "Yes", what were stresses?	Family	107	32.9
	Academic	160	49.2
	Work	25	7.7
	Other	33	10.2
56- If the answer is "YES", was the vehicle overcrowded at the time of accident?	Yes	141	20.3
	No	555	79.7
57- If the answer is "YES", were	Yes	241	33.8

there any younger adults (15-24 years old) inside the vehicle at the time of accident?	No	471	66.2
Total	**1254**		

A large proportion of participants surprisingly agreed with all of the suggested preventive messages against RTAs and RTIs including the use of a mobile phone during driving as a risk factor of RTAs 1005 (89.9%), road maintenance as an RTI preventive measure 970 (86.8%), use of a seatbelt as an RTI preventive measure 843 (75.3%), and (to some extent) the noisy environment caused by loud music as another RTA risk factor 592 (52.8%), as presented in Table 6.

Table 6: Preventive Measures

Question	Answer	Frequency	Percentage
58- Do you think putting on seat belt is a preventive measure against road traffic injuries (RTIs)?	Yes	843	75.3
	No	156	13.9
	Not sure	121	10.8
59- Do you think road maintenance is a preventive measure against road traffic injuries	Yes	970	86.8
	No	113	10.1
	Not sure	35	3.1
60- Do you think playing music loudly while driving is a risk factor that causes road traffic accidents (RTAs)?	Yes	592	52.8
	No	331	29.5
	Not sure	198	17.7
61- Do you think using a mobile phone while driving is a risk factor that causes road traffic accidents?	Yes	1005	89.9
	No	81	7.2
	Not sure	32	2.9
Total	**1254**		

Modeling of the study variables

The stepwise logistic regression model (Forward Stepwise (Likelihood Ratio)) included faculty, semester, age, marital status, job, income and residence as independent variables. The crude odds ratios for significant independent variables were calculated separately. Modeling of these data showed that college, age and type of residence had a significant influence on the behavior and capability of Saudi drivers, as shown in Table 7.

Table 7: Modeling of the Study Variables Using Stepwise Logistic Regression

Category	B	Crude OR	Adjusted OR	95% C.I. for Adjusted OR	
				Lower	Upper
College					
Engineering	0.390	.097	1.477	.300	7.267
BA	18.806	1.570	147055255.6	.000	.
Education	-0.735	3.141	0.479	.130	1.772
Science	-0.039	.606	0.962	.139	6.665
Age	-0.350	11.209	0.705	.513	.968
Residence(Rural)	-0.842	11.329	0.431	.188	.985
Constant	10.444		34328.322		

Conclusion

The mean age of participants was 21 years old, while the mean age of driving initiation was 14 years. Furthermore, most of the participants did not demonstrate a particular willingness to adhere to traffic restrictions or driving safety measures while driving, especially the use of a smart phone and WhatsApp in particular. Additionally, nearly two-thirds of the participants had experienced an RTA within the last five years. Nevertheless, surprisingly, a remarkable

majority of the participants agreed with all of the RTA risk factors and RTI preventive measures suggested in the questionnaire; in other words, the participants were adequately aware of these safety measures, but they chose not to follow them in most cases. This situation strongly indicates the need to intensify specialized educational interventions through lectures and workshops to improve the practice and attitudes toward driving among younger generations at the university level as well as secondary school level. Furthermore, continuing road safety measure awareness campaigns during public festivals and social, religious and scientific events in educational institutes, mosques, malls, and public markets is also highly recommended.

Limitations

There is still uncertainty regarding the findings due to potential selection bias, as the inferences were based on a random sample of a finite size of a population or process of interest.

Consent for Publication

Informed consent in the Arabic language was obtained from each participant before the questionnaire was administered and clearly indicated the voluntary nature of participation. This study obtained the approval of the Standing Committee for Biomedical Research Ethics of University of Jazan (No. SCBRE-1436-02).

Conflict of Interests Declaration

The authors have no conflicts of interest of any kind to declare.

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